

these claims can be found throughout the application as originally filed, for example, at pages 21-26.

New claims 54-65 involve mainsprings made from laminated amorphous metal sheets and timepieces having such mainsprings. Support for these claims can be found throughout the application as originally filed, for example, at pages 21-23.

Claims 66-70 relate to methods for forming spiral springs from amorphous metal. These claims find support throughout the application as originally-filed, for example, in Figs. 5 and 10, and in the disclosure at pages 21-23. No new matter has been added.

As set forth on the accompanying Fee Transmittal form, the Commissioner is authorized to charge \$684.00 fee for the presentation of new claims 51-70 to Deposit Account No. 19-4709.

**The Rejection Under
35 U.S.C. § 112, ¶ 2**

Claims 15 and 35 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter of the Applicants' invention. In particular, the Examiner indicated that the term "incorporated in substrate" lacked a proper antecedent basis in the disclosure. The Examiner asserted that this feature must be depicted. For the following reasons, Applicants respectfully traverse this rejection, and request withdrawal thereof.

This rejection is first traversed on grounds the asserted basis, that a claimed feature lacks antecedent basis in the disclosure, is improper.

The Court of Appeals for the Federal Circuit holds that 35 U.S.C. § 112, ¶ 2, only requires Applicant to particularly point out and distinctly claim the invention, and

Applicant submits that the pending claims fully comply therewith: "The test for definiteness is whether one skilled in the art would understand the bounds of the claim when read in light of the specification. [Citation omitted] If the claims read in light of the specification reasonably apprise those skilled in the art of the scope of the invention, § 112 demands no more." Miles Laboratories, Inc. v. Shandon Inc., 997 F.2d 870, 875, 23 USPQ2d 1123, 1126 (Fed. Cir. 1993) (emphasis added), cert. denied, 62 USLW 3492 (1994); Credle v. Bond, 25 F.3d 1566, 1576, 30 U.S.P.Q.2d 1911 (Fed. Cir. 1994).

A rejection under § 112, ¶ 2, cannot lie where the scope of the claims is clear to one skilled in the art having in mind the teachings of the disclosure. Here, those of ordinary skill in the art would find the claims to clearly demarcate the present invention, and so a rejection under § 112, ¶ 2, is not proper.

It is further submitted that the asserted basis for this rejection in fact would have been appropriate in a rejection under 35 U.S.C. § 112, ¶ 1, on grounds the specification did not provide support for the claimed invention, and under 37 C.F.R. § 1.83 on grounds the claim feature in question was not depicted in the drawings. However, as explained below, neither that rejection nor objection is now well-taken in this case.

The term in question, "incorporated in substrate", has been changed to -- supported by said substrate--. This claim feature finds support throughout the disclosure, for instance, at page 11, lines 8-10, page 19, lines 12-20, and in Fig. 6. Accordingly, neither a rejection under 35 U.S.C. § 112 nor an objection under 37 C.F.R. § 1.83, will now lie.

For all the foregoing reasons, favorable reconsideration and withdrawal of this rejection are earnestly solicited.

**The Rejections Under
35 U.S.C. § 102**

Claims 14, 16, 17, 20, 23, 25, 26, 28, 34, 36, 37 and 40 were rejected under 35 U.S.C. § 102(b) as being anticipated by either U.S. Patent No. 5,772,803 to Peker et al., U.S. Patent No. to 4,341,260 to Ishibachi et al., or Japanese Laid-Open Patent Appln. No. 57-108237 ("JP '237"). Applicants respectfully traverse these rejections and submit the following arguments in support thereof.

As described in claim 14, the present invention involves a spring formed of spirally arranged amorphous metal, the spring serving as a source of power.

Applicants' invention, as set out in claim 23, relates to a mainspring formed from spirally arranged amorphous material metal.

This invention, as presented in claim 34, also extends to a hairspring made from spirally arranged amorphous metal.

As will be explained in detail below, none of the cited references even suggests all the features of the claimed invention.

Peker merely discloses torsionally-reacting springs made from amorphous metal alloy. Peker repeatedly distinguishes torsionally-reacting springs from other springs:

One important type of spring is the torsionally reacting spring, in which the material of the spring is deformed wholly or partially in torsion (as distinct from linear tension/compression or bending). Well-recognized examples of torsionally reacting springs include torsion bars and torsion tubes, which are loaded by rotational forces at their ends. Conventional helical (also sometimes termed "coil" springs) are also torsionally reacting springs, as that term is used herein, because a mechanical analysis of their endwise extension or compression demonstrates that the material is deformed in a combination of torsion and bending. (col. 1, lines 20-30)

* * * *

As used herein, a springy article is a useful article that, during service, is deformable by a deformation force up to a material torsional proportional limit strain when loaded from an initial shape, yet returns to the initial shape upon relaxation of the deformation force. The present invention relates to torsional springs, generically termed "torsionally reacting springs" herein. In a torsionally reacting spring, the resolved force applied to the springy article is wholly or partially a torsional force, as distinct from an extension/compression force or a bending force. (However, there may be components of extension/compression force or bending force applied in addition to the torsional force.) (col. 2, line 59, through col. 3, line 3).

Peker goes on to explain why helical springs are torsionally-reacting springs:

FIG. 1C depicts a helical spring 30, which is loaded axially parallel to the direction 32 by either compression or extension forces. A mechanical analysis of the helical spring shows that the coils are loaded in a combination of torsional and bending loadings. The helical spring therefore falls within the definition of a torsionally reacting spring as used herein, because the material that forms the spring is deformed in torsion, at least in part. (col. 3, lines 25-32).

Such springs differ from and in no way suggest the claimed springs, which are mainsprings or hairsprings, both made from spirally arranged amorphous metal. It will be appreciated that such springs, which are arranged so as to lie in a plane, as shown in application Figs. 6-8 and 10, are not helical.

Peker therefore does not even suggest all the features of the claimed invention.

Ishibachi merely discloses a method of producing amorphous metal tape.

Ishibachi is only concerned with how such tapes are made, and nowhere does Ishibachi contain any teaching or suggestion that such tape be used as a spring, much less as a spring of the type claimed (spiral).

Ishibachi therefore also does not even suggest all the features of the claimed invention.

Only leaf-type contact springs suitable for use in securing batteries are taught in JP '273 (Fig. 1). Nowhere in the reference is there even a suggestion than a spring made of

amorphous metal be used as a mainspring or hairspring for a timepiece, much less that such a spring be a spiral spring, as claimed. JP '237 therefore in fact teaches away from the claimed invention, since once skilled in the art would be led by the reference to use amorphous metal only as a leaf-type contact spring in an electrical system.

It is well-accepted that a reference which lacks all the features of a claimed invention cannot anticipate that invention. As just noted, neither Peker, Ishibachi nor JP '237 suggests the aspects of the claimed invention relating to mainsprings or hairsprings made from spirally arranged amorphous metal. Accordingly, none of these references anticipates the claimed invention, and so this rejection cannot stand.

Nor do the cited references, whether taken alone or together, suggest the invention as claimed. The only springs taught therein are the helical springs of Peker and the electrical contact springs of JP '237. At most, one skilled in the art would be led to fabricate such helical or contact springs using the materials taught by Ishibachi, but they would not be led to the claimed spirally arranged amorphous metal spring.

The remaining rejected claims, claims 16, 17, 20, 25, 26, 28, 36, 37 and 40, all ultimately depend from and so incorporate by reference all the features of independent claims 14, 23 and 34. These other claims therefore patentably distinguish over the cited art at least for the same reasons as their respective base claims, which reasons are incorporated by reference herein.

Newly-presented claims 51-70 provide for either watch mainsprings or hairsprings that are made from spirally-arranged amorphous metal, mainsprings made from laminated amorphous metal sheets, or methods of forming spiral springs from amorphous

metal. None of these features are disclosed or even suggested by the cited art. Accordingly, new claims 51-70 are also patentable over that prior art.

For all the foregoing reasons, favorable reconsideration and withdrawal of this rejection are respectfully requested.

**The Rejection Under
35 U.S.C. § 103**

Claims 14-40 were rejected under 35 U.S.C. § 103 as being unpatentable over Peker et al., Ishibachi et al., or JP '237. Applicants respectfully traverse this rejection and submit the following arguments in support thereof.

Independent claims 14, 23 and 34 already have been summarized in connection with the foregoing rejection under § 102, and reference is now made to such claim summaries.

It should be noted that the present invention provides unexpectedly superior results as compared with conventional spiral watch springs; the driving mechanism of the timepiece (or music box) can be moved at a more constant speed, and the number of turns that the spring can be wound is increased, extending the period for which the power source can be operated. These remarkable benefits are recognized and described quantitatively in the present application, for example, in Figs. 1, 3 and 4, and at pages 5-10 and 15 of the specification.

Such unexpected superiority is a secondary indicium of non-obviousness, which the M.P.E.P. recognizes must be considered and given weight when evaluating non-obviousness. M.P.E.P. § 2141.01. See also M.P.E.P. § 2144.08(II)(B) ("Rebuttal evidence and arguments can be presented in a specification (citation omitted).... Rebuttal evidence may also include evidence that the claimed invention yields unexpectedly improved properties or properties not present in the prior art."). The evidence here establishes the patentability of Applicants' invention.

Neither Peker, Ishibachi nor JP '237 suggests the aspects of the claimed invention relating to mainsprings or hairsprings made from spirally arranged amorphous metal. The only springs taught are the helical springs of Peker and the electrical leaf-type contact springs of JP '237. Ishibachi does not even teach springs. Accordingly, one skilled in the art at most would be led to fabricate the helical springs of Peker or the contact springs of JP '237 using the materials taught by Ishibachi. Nowhere would they find a teaching that would lead them to the claimed spirally arranged amorphous metal spring.

In fact, those skilled in the art would be led **away** from the claimed invention by the teachings of Peker; as already noted above, Peker distinguishes its torsionally-acting springs from cantilevered springs. As shown in application Fig. 2, and explained at page 7 of the specification ("the flexure of a mainspring 31 (having a thickness t, a width b and a length L) can be approximately determined, as shown in Fig. 2, as a **flexure of a cantilevered supporting beam**") (emphasis added), spiral springs as claimed are not torsionally-acting springs, because they are elastically deformed through bending, not by twisting of the spring material.

The other rejected claims, claims 15-22, 24-33 and 35-40, all ultimately depend from and so incorporate by reference all the features of independent claims 14, 23 and 34. These other claims therefore patentably distinguish over the cited art at least for the same reasons as their respective base claims, which reasons are incorporated by reference herein.

Newly-presented claims 51-70 provide for either watch mainsprings or hairsprings that are made from spirally-arranged amorphous metal, mainsprings made from laminated amorphous metal sheets, or methods of forming spiral springs from amorphous

metal. None of these features are disclosed or even suggested by the cited art. Accordingly, new claims 51-70 are also patentable over that prior art..

For all the foregoing reasons, favorable reconsideration and withdrawal of this rejection are respectfully requested.

SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT

In compliance with the duty of disclosure under 37 C.F.R. § 1.56 and in accordance with the practice under 37 C.F.R. §§ 1.97 and 1.98, the Examiner's attention is directed to the document listed on the enclosed Form PTO-1449. A copy of the listed reference is also enclosed.

Applicants submit that while the cited reference, U.S. Patent No. 4,428,416, is directed to the manufacture of a multi-layer amorphous metal, that reference in no way even suggests a spring formed from spirally arranged amorphous metal, such as in the present invention.

It is respectfully requested that the above information be considered by the Examiner and that a copy of the enclosed Form PTO-1449 be returned indicating that such information has been considered.

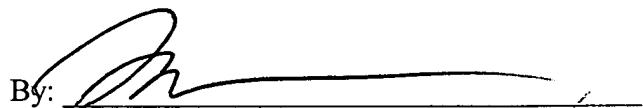
This Supplemental Information Disclosure Statement is being filed pursuant to 37 C.F.R. § 1.97(c). As set forth on the accompanying Fee Transmittal form, the Commissioner is authorized to charge the requisite fee under 37 C.F.R. § 1.17(p) required by 37 C.F.R. § 1.97(c)(2), as well as any other fee deficiency or fee which may now or hereafter be due, to Deposit Account No. 19-4709.

CONCLUSION

Applicants respectfully submit that all outstanding rejections and objections have been addressed and are now either overcome or moot. Applicants further submit that all claims pending in this application are patentable over the prior art. Reconsideration and withdrawal of those rejections and objections is respectfully requested.

Early and favorable consideration of the above referenced application in light of these amendments is earnestly requested.

Respectfully submitted,

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VERSION MARKED TO SHOW CHANGES MADE:

Amend claims 14, 15, 23, 34 and 35:

14. (Amended) A spring, said spring being formed of spirally arranged amorphous metal and serving as a source of power.

15. (Amended) A spring as recited by claim 14, wherein said spring is [incorporated in] supported by a substrate, said spring defining a flexure.

23. (Amended) A mainspring, said mainspring being formed [from an] of spirally arranged amorphous [material] metal.

34. (Amended) A hairspring, said hairspring being [made from an] formed of spirally arranged amorphous metal.

35. (Amended) A hairspring as recited by claim 34, wherein said hairspring is [incorporated in] supported by a substrate, said hairspring defining a flexure.